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# The Discriminatory Effect of Domestic Regulations on International Trade in Services: Evidence from Firm-Level Data*

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**Abstract**

In order to promote international trade in services, the WTO-GATS aims at progressively eliminating *discriminatory* regulations, which apply to foreign suppliers, by guaranteeing equal national treatment. This paper looks instead at the trade effect of *domestic* regulations, which apply to all firms indifferently and do not intend to exclude foreign suppliers. We propose a theory-based empirical test to determine whether or not these domestic regulations affect foreign suppliers more than local ones. We take this test to the data by using French firm-level exports of professional services to OECD countries. Our econometric results show that domestic regulations in the importing markets matter significantly for trade in services. They reduce both the decision to export and the individual exports. These results tend to prove that domestic regulations are *de facto* discriminatory even if they are not *de jure*.

Keywords: Trade in services, Domestic Regulations, Firm Heterogeneity.

JEL codes: F1, L8.

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# 1 Introduction

Services account for about two thirds of the GDP and nearly half of total employment in advanced economies. The share of services activities in GDP has also risen in middle and low income countries, reaching about 50% in 2007 in the poorest countries in the world (Francois and Hoekman, 2010). Nevertheless, international trade in services still accounts for only one fifth of world trade (WTO, 2008). Of course, many services require proximity between buyers and sellers which prevents most of them from being internationally traded. However, if one focuses solely on services that do not require proximity (i.e. arm's length services),[1] the international trade of services remains limited: simple calculations from EBOPS-OECD and STAN-OECD databases on the US economy in 2008 show, for instance, that the share of exports of services in the total production of arm's length services is around four times smaller than the share of exported goods in total manufacturing. Why then is there so little trade in arm's length services?

The recent literature points to the significant role played by market regulations (see Francois and Hoekman, 2010 for a survey). In OECD countries at least, the regulations in services are found to be relatively high compared to those in the manufacturing sector. Whether or not a high degree of regulation is justified in the service sectors is beyond the scope of this paper, which focuses only on the consequence of regulations on trade in services.[2] Deardorff and Stern (2008) propose a taxonomy of different regulations that could apply to most if not all services. Some regulations can impact entry (i.e. licenses, administrative handling, etc), while others are linked to ongoing operations (prudential measures, price controls, etc). The former usually designate fixed costs, while the latter are rather linked to variable costs. Most of these regulations apply to all sellers alike; they are non-discriminatory. We shall call them *domestic* regulations in the rest of the paper. Others, however, are discriminatory against foreign suppliers. In this case, regulations become instruments of protection, and act as non-tariff barriers (NTBs) to international trade in services. The General Agreement on Trade in Services (GATS) is mainly concerned with NTBs in the service sectors.[3] Its purpose is to ensure equal treatment between national and foreign suppliers of services, but not necessarily to reduce or harmonize *domestic* regulations among WTO members.[4] Nevertheless, domestic regulations might also discriminate against foreign sellers. Indeed, foreign sellers can be more sensitive to regulations than their domestic counterparts as they do not have access as easily to information to avoid or comply with local legislations.

So far, the existing empirical literature has provided evidence in favor of a significant

[1] An expression that has been made popular by Bhagwati *et al.* (2004).

[2] There is a debate in the literature over the efficiency of regulations: high regulations in services might be justified by the frequent presence of natural monopolies or asymmetric information in the market (Hoekman and Mattoo, 2011). They are set to promote efficiency or equity. Another strand of the literature shows however that by introducing additional costs and/or distortions to competition, some regulatory policies might not be efficient for firm level performance and/or macro-level growth (e.g. Blanchard and Giavazzi 2003, Nicoletti and Scarpetta 2003, and Arnold *et al.*, 2008).

[3] See the WTO website devoted to the GATS at `http://www.wto.org/english/tratop_e/serv_e/gats_factfiction_e.htm`

[4] Hoekman (2006) and Borchert, Gootiiz and Mattoo (2012) propose an assessment of the importance and the impact of NTBs in services.



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trade effect of regulations in the service sectors. More specifically, Kox and Nordas (2007), and Lennon *et al.* (2009) use aggregate data on bilateral trade in services from the OECD and show that regulations in the origin and destination countries have a strong negative impact on aggregate services exports. Kox and Lejour (2005) show that it is not only the level of regulations which matters for exports but also their structure. Controlling for unobserved country heterogeneity, Schwellnus (2007) finds a smaller – but still significant – elasticity of bilateral trade with respect to market regulations. Van der Marel and Shepherd (2011) investigate the role of Regional Trade Agreements on the trade in services creation and diversion effects.[5] It is noteworthy that all these studies only tend to prove that foreign producers are harmed by regulations in destination markets. But they remain silent on whether or not they are more affected than domestic producers. Indeed, if non-discriminatory regulations induce a higher cost to deliver a service, they should reduce local sales as well as imports. Therefore, a negative correlation between regulations and services imports does not prove that these regulations discriminate against foreign suppliers and can be considered as a trade barrier.

This paper goes one step further. We apply an empirical test to examine explicitly whether domestic regulations in professional services are *de facto* discriminatory, while they are not *de jure*. To do so, we rely on firm-level trade data and our contribution to the existing literature is actually threefold. First, our regressions illustrate how regulations in the importing countries affect both the decision of foreign firms to export services and their individual export values. Second, we look at the nature of domestic regulations by examining whether they act as a variable or a fixed cost. Third, and more importantly, we perform an empirical test, guided by theory, which enables us to determine explicitly whether domestic regulations in services discriminate against foreign sellers, thus shadowing an international trade barrier. Our empirical analysis uses French firm-level data on trade in services, provided by the Banque de France. This kind of data has only recently become available in a few countries. Recent studies using firm-level data on trade in services include Breinlich and Criscuolo (2011) for the UK, Ariu (2012) for Belgium, Conti *et al.* (2010) for Italy, Kelle and Kleinert (2010) for Germany and Walter and Dell'mour (2010) for Austria. These studies mainly describe the characteristics of firms engaged in international trade in services without linking them to regulations in the service sectors.

Our Banque de France database provides exhaustive information on the services traded by each French firm by destination country and type of service. We focus our analysis on professional services, for two important reasons. First, professional services are traded under Mode 1, i.e. at arm's length (unlike tourism, for instance) and independently from trade in goods (unlike transport services). Second, we need trade data that match the available data on domestic regulations. We use the Non-Manufacturing Regulation $NMR$ indicator specific to professional services, provided by the OECD, in the Product-Market Regulations database. This indicator is available for 3 years: 1998, 2003 and 2008. This database is based on questionnaires filled out by the competent authorities in each OECD country. It has been widely used in the literature. More specifically, Bourles *et al* (2013) and Barone

[5]Earlier studies focused on specific sectors: Mattoo and Mishra (1998) looked at both discriminatory and non-discriminatory regulations in the case of Indian engineers, lawyers and architects in the United States. Findlay and Warren (2000) compiled several sectoral studies carried out by the Australian Productivity Commission (banking sector, telecommunications, and professional services).

and Cingano (2011) have recently used the $NMR$ index to look at the impact of policies in upstream services sectors on manufacturing outcomes.

We find that domestic regulations have a negative and statistically significant impact on the extensive and the intensive margin of trade in services. This result is consistent with only one particular case raised by our theoretical model: the case in which domestic regulations increase the variable costs more for foreign suppliers than for domestic sellers. This means that domestic regulations are *de facto* discriminatory. Furthermore, we find little evidence that domestic regulations in a given country impact the fixed entry cost of exporting to this country significantly. In the next section, we present the set-up on which we base our tests. Section 3 describes the data and section 4 shows some stylized facts on French exporters of services. Section 5 presents the econometric results. Section 6 and 7 check the robustness of our results to alternative empirical specifications and theoretical hypotheses. Section 8 tests the impact of regulations on the export fixed costs. Section 9 concludes.

# 2 Theory

Complying with market regulations is certainly not costless, both for domestic and foreign firms. However, because it is hard to know precisely what kind of cost they involve, assessing the exact impact of domestic regulations on bilateral trade flows is not trivial. Indeed, regulations can take the form of an additional fixed entry cost, a marginal cost, or both. Moreover, they might be equally burdensome for foreign and domestic companies or be discriminatory, affecting foreign firms relatively more. This section outlines a simple model of trade in order to present the mechanisms at work and list our empirical predictions. We do not aim at presenting a structural model to be tested but simply to determine the kind of consequences which regulations might have on firm-level trade flows. We consider the market for a given tradable service in country $d$. Consumers have CES preferences over a continuum of imperfectly substitutable varieties produced by monopolistically competitive firms. Firms located in country $o$, aiming to serve market $d$ incur a fixed entry cost, $F_{od}$. The sales of firms on market $d$ are determined by a combination of destination country characteristics, some bilateral elements linking the origin and the destination countries (such as transaction costs), and firm-level ability, $a$.[6] More precisely, the CES utility maximization under budget constraint provides the demand for services addressed by country $d$ to a firm located in country $o$ with ability $a$:

$$x_{od}(a) = p_{od}(a)^{1-\sigma}(E_d/\Phi_d)\Lambda_{od}(a), \tag{1}$$

where $\Lambda_{od}(a)$ takes a value of one if the firm has decided to enter market $d$ and zero otherwise. $p_{od}(a)$ is the price which the final consumer is charged for one unit of the output of the firm; and $\sigma$ is the price elasticity ($\sigma > 1$). $E_d$ is the market size in country $d$. $\Phi_d$ is inversely related to the price index in country $d$ and captures the strength of the competition. It is positively influenced by the number of competitors in this market and negatively by their

[6] In the following, we implicitly consider that $a$ represents the productivity of firms and determines the delivered price of its variety. Without a loss of generality, we could have assumed that $a$ captures the ability of the firm to attain a higher level of quality. Then, the price variable, which is apparent in the following equations, would stand for the inverse of the quality-adjusted price.

respective delivered price. A firm from country $o$, with ability $a$, will enter market $d$ if its current profits cover the fixed cost. With constant mark-up, one obtains that the probability for a firm to enter is:

$$P\left[\Lambda_{od}(a)=1\right]=P\left[x_{od}(a)>\sigma F_{od}\right]. \tag{2}$$

Services market regulations of country $d$, $B_d$, might be associated either with a fixed entry cost or a marginal cost. We consider both cases, setting $F_{od}=B_d^{\eta}$ ($\forall o$, with $\eta\geq 0$) and assuming that $B_d$ enters positively in international and intra-national transaction cost functions. Moreover, we consider that market regulations might be *de facto* discriminatory, in the sense that foreigners might be more sensitive to similar regulations faced by domestic producers. The delivered price of imported and local services are respectively:[7]

$$p_{od}(a)=p_o(a)t_{od}B_d^{\gamma},\quad \text{and}\quad p_{dd}(a)=p_d(a)t_{dd}B_d^{\kappa},\quad 0\leq\kappa\leq\gamma, \tag{3}$$

$p_o(a)$ denotes the production price of a variety of services imported from country $o$, and $t_{od}$ is the transaction cost (cost to deliver to country $d$). Similarly, $p_d(a)$ is the production price of services delivered domestically and $t_{dd}$ is the intra-national delivering cost. Market regulations in country $d$ will be discriminatory if $\gamma>\kappa$, and non-discriminatory if $\kappa=\gamma$. Finally, the toughness of competition in the market, $\Phi_d$, is:

$$\Phi_d=\left[\int_{a\in\Omega_{dd}}\left[p_d(a)t_{dd}B_d^{\kappa}\right]^{1-\sigma}+\sum_{o\neq d}\int_{a\in\Omega_{od}}\left[p_o(a)t_{od}B_d^{\gamma}\right]^{1-\sigma}\right], \tag{4}$$

where $\Omega_{od}$ is the set of varieties produced in country $o$ and available in country $d$. We obtain the elasticity of firm-level exports with respect to market regulations in the destination country from Equation (1):

$$\varepsilon_B^x=\frac{\partial x_{od}(a)}{\partial B_d}\frac{B_d}{x_{od}(a)}=\left[(1-\sigma)\gamma-\frac{\partial\Phi_d}{\partial B_d}\frac{B_d}{\Phi_d}\right]. \tag{5}$$

Equation (5) indicates that the impact of destination market regulations on firm-level export values is twofold. A direct effect is captured by the first term in the brackets. It is unambiguously negative if $\gamma$ is positive. The second term shows an indirect effect channeled by changes in the price index. Indeed, market regulations should reduce the number of competitors in the destination country and raise the delivered price of each service variety. This will impact the demand addressed to all incumbent firms in this market positively. The overall elasticity of the exports by firms with respect to market regulations is undetermined *a priori*. It could be zero, positive or negative.

Similarly, the impact of domestic regulations on the export decision of a firm in country $o$ is largely undetermined. But Equation (2) provides some clues about the sign of the elasticity of the probability of exporting with respect to the level of regulations, $\varepsilon_B^P$. It must be positive if $\varepsilon_B^x>\sigma\eta$ and negative if $\varepsilon_B^x<\sigma\eta$.

[7] We could have assumed that the fixed cost is also discriminatory (i.e. that the fixed cost in a market is not the same for all countries, with $F_{od}>F_{dd}$, $\forall o\neq d$). But, in our context, the fact that foreign and domestic firms face the same fixed cost or not does not change the theoretical predictions. We thus consider that all domestic and foreign producers incur the same entry cost, $F_d$.

Let us consider different hypotheses on the nature of market regulations. They can be considered as a fixed entry cost ($\eta > 0$), a marginal cost ($\gamma > 0$ and $\kappa > 0$) or both. Moreover, they can be discriminatory ($\gamma > \kappa$) or not ($\gamma = \kappa$). The theoretical predictions are summarized in Table (1).

Table 1: Signs of the Elasticities of Firm-Level Exports and Export Decisions with Respect to Destination Market Regulations

| | | No entry cost $\eta = 0$ | Entry cost $\eta > 0$ |
|---|---|---|---|
| No marginal cost | Export value ($\varepsilon_B^x$) | 0 | + |
| $\gamma = \kappa = 0$ | Export decision ($\varepsilon_B^P$) | 0 | - |
| Non-discriminatory marginal cost | Export value ($\varepsilon_B^x$) | 0 | + |
| $\gamma = \kappa > 0$ | Export decision ($\varepsilon_B^P$) | 0 | - |
| Discriminatory marginal cost | Export value ($\varepsilon_B^x$) | - | ? |
| $\gamma > \kappa \geq 0$ | Export decision ($\varepsilon_B^P$) | - | - |

Let us begin with the case where regulations do not influence the marginal cost: $\gamma = \kappa = 0$. The signs of $\varepsilon_B^x$ and $\varepsilon_B^P$ are shown in the first two rows of Table (1). Obviously, these elasticities are simply zero if regulations have no influence on the fixed cost. But if complying with regulations involves an additional entry cost ($\eta > 0$), they should impact the export decision negatively ($\varepsilon_B^P < 0$). As the number of firms which are active in the market diminishes, $\Phi_d$ falls and the second term in Equation (5) becomes negative, while the first one is zero. Then, each firm which remains active in this market has larger sales: $\varepsilon_B^x > 0$.[8]

The theoretical predictions are exactly the same if the influence of regulations on marginal costs is positive and identical across domestic and foreign firms ($\gamma = \kappa > 0$). First, if they only reach variable costs (no impact on the entry cost), the first and second terms in Equation (5) exactly cancel out. Indeed, with CES preferences and ad valorem trade costs, if all firms face the same shock on their marginal costs, the direct negative impact it has on their sales is exactly offset by the lessening of competitive pressure. Second, if regulations also increase fixed costs ($\eta > 0$), we expect a positive relationship between regulations and the sales of firms due to a decrease in the number of competitors.

Finally, domestic regulations will have a negative impact on the exports by foreign firms only if they hurt foreigners more than local producers, i.e. $\gamma > \kappa \geq 0$. In this case, for foreign firms, the indirect positive effect in Equation (5) will not offset the direct negative effect, and their export value should decrease. Because $x_{od}(a)$ decreases, the probability of exporting is also negatively affected. If one further assumes that regulations increase the fixed entry cost, the negative impact on the export probability would be even greater. But if $\sigma\eta$ is very large, the decrease in the number of firms which are active in market $d$ could be sufficiently large to compensate the direct effect of regulations on the exports by firms. The sign of $\varepsilon_B^x$ is undetermined in this case.

Our empirical analysis will estimate the signs of $\varepsilon_B^x$ and $\varepsilon_B^P$ in order to infer the nature of the trade costs involved by domestic regulations in services and identify whether or not they

[8]It is straightforward that the case of a discriminatory fixed cost provides the same sign effects as those reported in the last column of Table 1.

are discriminatory. Of course, some of the theoretical predictions summarized in Table (1) are specific to our modeling choices. For instance, the fact that the direct and indirect impacts of non-discriminatory regulations cancel each other out is the outcome of two assumptions: CES preferences and the ad valorem cost of complying with regulations. Section 7 investigates the consequences of relaxing these two assumptions, but shows that our data supports our baseline model against the alternative ones.

# 3 The Data

Our empirical analysis uses two different sources of data. The exhaustive record of services exports by French firms and the OECD measures of services market regulations. This section details and describes the main features of our data.

## 3.1 The Banque de France Database for Services Trade

We use micro-level data, from the Banque de France, on French exporters of services. The services covered in the database fall into the Mode I classification by the GATS.[9] The Banque de France data come either directly from the company itself,[10] or from commercial bank declarations. For each firm, the database records the annual amount of its transactions, the nature of the service traded and the partner country. The product classification used by the Banque de France database is slightly different than the *Extended Balance of Payments Services Classification (EBOPS)*. It identifies 21 types of services. Among them, there are four types of professional services: "Operational leasing services", "Research and development, architectural engineering and other technical services", "Legal, accounting, auditing, bookkeeping and tax consulting services" and "Other business services". We aggregate them all, at the firm, destination and year level, into a single "Professional services" category. Destinations are split between 250 countries, and the data is available from 1999 to 2007. Looking at the data in 2003, the original database reports Mode I positive export flows for 13,703 French firms, with a total value close to 28 billion euros.

However, given the aim of this paper, we need to focus on a restricted sample of firm-level exports. First, we focus on the firms that (i) export professional services, (ii) have their main activity in business services sectors, and (iii) export to countries for which we have information regarding regulation and local demand.[11] We detail, step by step, how the different restrictions we impose on our sample change the number of firms and the total export values. To avoid flooding the text with numbers and confuse the reader, we only present the changes in the number of firms and the total exports in 2003.[12] As mentioned before, we start with 13,703 firms, exporting 28 billion euros of services on aggregate. We only have information on the main activity of the firms for 6,898 of them. This information is provided by the French Statistical Institute (INSEE). These 6,898 firms export 23 billion

[9] Mode I covers all services exchanged between residents and non-residents across borders.

[10] This mainly concerns the biggest ones, called *Déclarants Directs Généraux*.

[11] We use an unbalanced panel with at most 28 countries, but data is not available for all of them each year.

[12] Figures for 1999 and 2007 are of course available upon request.

euros of Mode I services. Restricting to firms exporting professional services leaves us with 5,144 firms, accounting for about 10.9 billion euros of total exports. We further restrict our sample to the firms registered in the business services sectors.[13] This second step reduces our sample to 2,543 firms, and the total exports are down to 6.1 billion euros. Finally, we restrict our trade data to the destinations and years for which we have information on the level of market regulations. Such information is available for 25 countries (excluding France) at most and for 1998, 2003 and 2008. Thus, considering that, for a given country, the annual changes in the level of regulations are small, we match the regulations in 1998 with the trade data in 1999 and the regulations measured in 2008 with the trade flows observed in 2007. Having considered all these restrictions, our final database is made up of three years of observations. In 1999, we have 1,517 firms exporting to 18 countries. Because very few firms export to many countries, we are left with only 2,955 positive export flows, for a total value of 3.2 billion euros. In 2003, the database covers 2,219 firms and 25 countries. There are 4,304 strictly positive export flows, representing 4.8 billion euros. In 2007, the database covers 1,870 firms, 23 countries, with 3,566 strictly positive trade flows, representing a total of 4.4 billion euros.[14]

## 3.2 Indicators of Domestic Regulation

The OECD has developed a series of product market regulation ($PMR$) indicators. Some, usually referred to as Non-Manufacturing Regulation indexes ($NMR$), are specific to the service sectors (professional services, energy, transport and communication). They measure the overall restriction to competition in the service sectors. Both the $PMR$ and $NMR$ indexes have been widely used in the literature studying the impact of regulations on economic outcomes (Jean and Nicoletti 2004, Conway and Nicoletti 2006, Barone and Cingano 2011, Bourles *et al.* 2013). In order to match our trade data, we work with the $NMR$ index specifically related to professional services.

To produce these indicators, the OECD proceeds in two steps. First, a questionnaire is set up and sent to the competent authorities in each OECD country.[15] Questions are either qualitative ("Do national, state or provincial government control at least one firm in the Insurance sector?") or quantitative ("For how many services does the profession have an exclusive or shared exclusive right to provide?"). Questions fall into two broad categories: barriers to entry and constraints on the conduct of operations. Entry regulations ($NMR - Entry$ hereafter) focus mainly on rules concerning licensing or minimum educational requirements, while the regulation of ongoing activities ($NMR - Conduct$ hereafter) is associated with price-setting policies or framing advertisements. Second, the OECD transforms all the responses to the questionnaires into quantitative data. Three $NMR$ indexes are obtained using a scoring algorithm that attributes a specific weight to each question: the first measures the overall restriction to competition, the second measures the one relative to entry

[13] We drop firms belonging to the manufacturing sectors, and those in wholesale, retail, transport, public administration, education, health, non-profit, recreative activities, and personal services sectors.

[14] See Table  in the appendix for a list of the countries and years available in the database.

[15] The questionnaire and the individual data used to construct the $NMR$ index for professional services can be found at: `http://www.oecd.org/document/24/0,3746,en_2649_34323_35858776_1_1_1_1,00.html`. See Wolfl *et al.* (2009) for a detailed description of the $NMR$ indices.

and the third describes regulation on the conduct of operations. Indexes range from 0 (low level of regulations) to 6 (high level of regulations). Because we are interested in purely domestic regulations, we have modified the OECD indicators slightly by excluding one question from the questionnaire which explicitly targets foreign firms, while using exactly the same method and applying the same weighting coefficients[16]. The $NMR$ we obtain is highly correlated with the original one, and using the latter in all our regressions does not alter our conclusions.[17]

The rest of the data used in the econometric analysis is described in Section 5 below.

# 4 Stylized Facts

This section displays stylized facts on French exporters of services and on regulations in destination markets.

## 4.1 French Exporters of Services

A striking feature of the data is that only a few firms are able to export professional services. After matching our trade data with the information on the main activity of the firm, we find that the firms exporting professional services account for about 2% of the firms in the professional services sectors. This share is nine times smaller than the share of firms exporting goods in the manufacturing sectors. Eaton, Kortum and Kramarz (2004) report that about 17% of French manufacturing firms exported some good to at least one destination in 1986, while Bernard *et al.* (2007) report a very similar figure (18%) for the US in 2002.

Moreover, among the exporting firms, the concentration of exports in our sample is very high, suggesting that only a few extremely competitive firms are able to export their services to many countries. Figure 1 gives an idea of the concentration of exports among the exporters in our sample, in 2003.[18] While 72% of the firms export to one market, they make up only 15% of the total exports of professional services. Almost 95% of the exporters serve 5 markets at most, but represent only 35% of the total exports. On the other side of the distribution, 1% of the exporters serve more than 15 markets, but account for 40% of the total French exports of professional services.

## 4.2 Domestic Regulations

Figure (2) displays the $NMR$ indicator by country between 1999 and 2007.[19] The $NMR$ indicator shows substantial variations across countries and years. For the majority of countries,

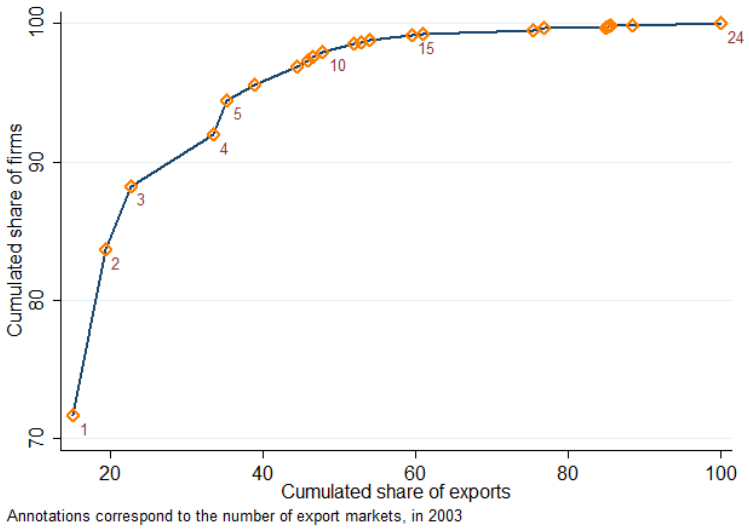
[16]The question that has been excluded is: "Is the number of foreign profesionnals/firms permitted to practice restricted by quotas or economic needs tests?"

[17]For robustness checks, we have also considered an alternative regulation measure, the Trade Restrictiveness Index ($TRI$) provided by he Australian Productivity Commission. The results, available upon request, are qualitatively and quantitatively similar to those we obtain with the $NMR$. However, as the $TRI$ is only available for 1999, and for a limited number of countries, it provides less robust results.

[18]The figure is similar whether we use data for 1999 or 2007.

[19]Figure (2) reports the $NMR$ only for the countries and years included in our sample (we have data on regulations and local demand in 1999, 2003 and 2007 for only 16 countries out of 28).

Figure 1: Export Concentration in 2003




the indicator has declined over time. This decline has been relatively stronger for countries with high or intermediate levels of regulations, suggesting some convergence between OECD countries. More specifically, the US, Japan, Spain and Austria have experienced the strongest decrease. However, the level of regulation has increased for some countries (Denmark, Italy, Canada, and Portugal among others).

Figure 2: Changes in Regulation over Time

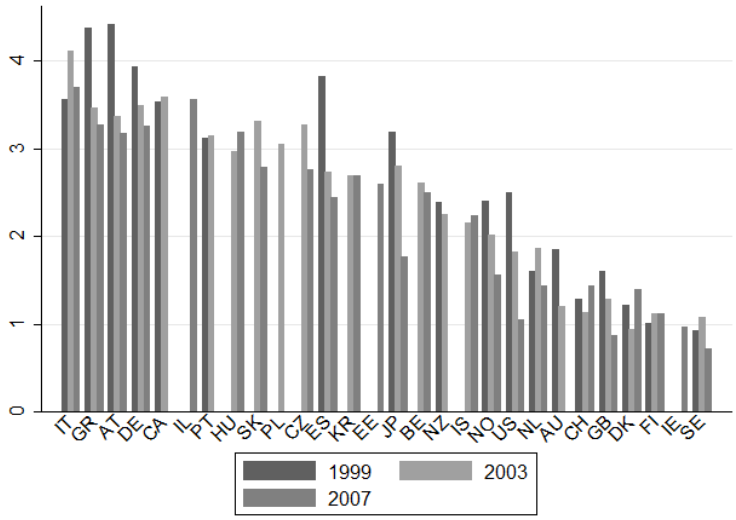



Figure (3) crosses 3 variables from our database in 2003: the two main components of the $NMR$, and the number of French exporters in each market. The figure shows that the two main components of the $NMR$ index (Conduct of Operations and Entry Barriers) are

highly correlated. A simple regression between the two components gives a coefficient of 0.88, not statistically different from 1. This strong correlation prevents us from using both indexes at the same time in an econometric analysis. Moreover, at first sight and without controlling for other factors, there seems to be no monotonic relationship between the level of regulation (defined by either component of the $NMR$ index) and the number of French exporters to this market.

Figure 3: Components of the $NMR$ Index and Number of French Exporters - 2003

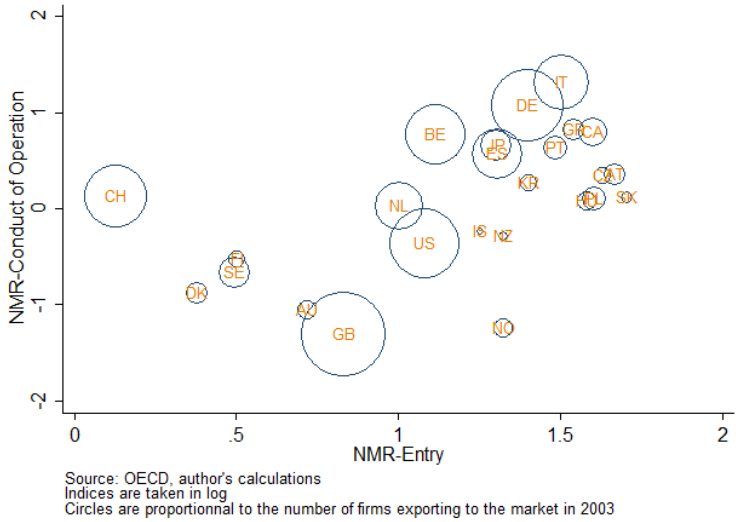
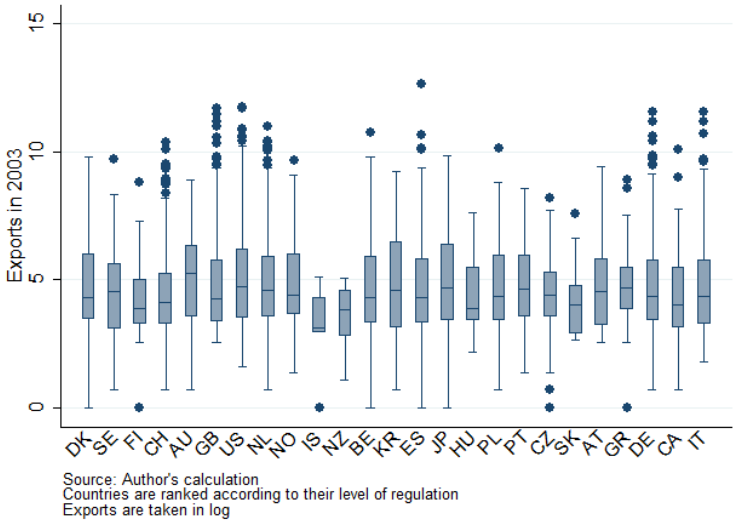



Figure (4) presents the distribution of the log of French export values across countries. The countries are sorted by increasing level of regulation: from Denmark (0.94) to Italy (4.11). For each destination market, the plain box represents the [25%; 75%] interval of the export distribution across French exporters, with the median inside the box, an upper adjacent value above, and a lower adjacent value below. Firms with a low export value will be between the lower adjacent value and the first quartile. The lower adjacent value is located 1.5 times the inter-quartile range below the first quartile. Any firm exporting less than the lower adjacent value is an "outside value", marked with dots on the figure. The same logic applies to the upper adjacent value. No clear pattern emerges from the figure. If only fixed costs were to play a role in regulating markets, theory predicts that regulations should smooth the competitive pressure on the market, allowing the firms in place to sell more. Then, the whole distribution of individual export values should be raised with respect to an increase in the $NMR$. Alternatively, if regulations only appeared in variable costs instead, all things being equal, we should then observe a downward shift of exports with respect to an increase in regulations. None of these predictions appear in Figure (4). An econometric analysis is needed to explicitly control for the other determinants of bilateral trade (such as trade costs, local demand or firm-specific factors), to identify the type of costs induced by regulations.

Figure 4: Distribution of Exports - 2003




# 5 Econometric Results

Theory guides our empirical analysis. By replacing the CIF price given by Equation (3) into Equations (2) and (1), we obtain two gravity equations that will be estimated. The first is related to the firm-level export value, while the second refers to the decision of the firm to export.

$$x_{od}(a) = (p_o(a)t_{od}B_d^{\gamma})^{1-\sigma}(E_d/\Phi_d)\Lambda_{od}(a), \tag{6}$$

$$P\left[\Lambda_{od}(a) = 1\right] = P\left[(p_o(a)t_{od}B_d^{\gamma})^{1-\sigma}(E_d/\Phi_d) > \sigma F_{od}\right]. \tag{7}$$

This section presents the details of our econometric specifications and discusses the empirical results.

## 5.1 Econometric Specification

For both Equations (7) and (6), we have three sets of right-hand side variables: destination-related variables, bilateral variables capturing various dimensions of trade costs, and a firm-level characteristics variable. Destination-related variables cover the market size ($E_d$), the price index ($\Phi_d$) and market regulations ($B_d$).

The market size is measured by the demand for professional services in the destination markets. We compute this variable by subtracting net exports from the national production of professional services. For production, we use OECD-STAN (ISIC-Rev.3) data, and keep the production of sector code C71T74.[20] Data on the exports and imports of Business

[20]This sector includes "Renting of Machines and Equipment" (C71), "Computer and Related Activities" (C72), "Research and Development" (C73) and "Other Business Services" (C74). Category (C72) encompasses the production of IT services. Category (C71) is not part of professional services, and should not be included in our measure of local production. However, we work with aggregate production cat-

Services are from the OECD as well.

Equations (7) and (6) suggest that we should control for the determinants of the price index ($\Phi_d$). However, our empirical strategy to identify the impact of market regulations on international trade (summarized in Table 1) is based on the interpretation of the sign of the elasticities of export decisions and export values with respect to market regulation. These elasticities include the indirect effect of market regulations on the price index. Hence, to ensure that the coefficients on the variable $B_d$ capture both the direct and indirect effect of the regulations, we need a proxy for the price index ($\Phi_d$) that is not directly affected by the regulations. A good proxy is the Real Market Potential index ($RMP$), computed using the method developed in Head and Mayer (2011). It accounts for exogenous determinants of competition, such as the geographic location of the destination market and, because it takes the production of the manufacturing sectors only into account, it is likely to be unaffected by the regulations in the service sectors. We take this index from the CEPII's Market Potentials database.[21]

Variable ($B_d$) will be measured by the $NMR$ index. To make sure that this variable does not also capture the overall political and economic environment in the destination country, we explicitly control for the quality of institutions in the destination market, using the Rule of Law Index, developed by the World Bank.[22]

Turning to bilateral variables, we proxy the transaction costs ($t_{od}$) by the geographic distance between countries and a dummy indicating whether the destination country has French as an official language. These data are taken from the CEPII's Distance database.[23] We also include a dummy characterizing border countries. This dummy is specific to each firm. Using the information we have on the location of the firm within France, we construct a variable that takes the value 1 if the firm is located in a French region sharing a border with the destination country, and 0 otherwise. It is well known that borders matter for international trade flows (see McCallum, 1995 and Anderson and van Wincoop, 2003), but not all French firms share the same advantage when exporting to neighboring countries. Firms from the South of France might have a better knowledge of the Spanish market than firms located in the Northern region of France. Our firm-level border variable accounts for this advantage. Finally, the individual ability of the exporter determining $p_o(a)$ is hardly observable. We account for it with year×firm fixed effects. In addition, about 14% of the exporters of services in our sample also export goods. For 12.7% of the observations, the

egory (C71T74) because it is available for a larger set of countries, while the details at a lower level of aggregation are missing for many countries. Besides, when the full data is available, "Renting of Machines and Equipment" accounts only for 6% of the production of category (C71T74) on average. Its inclusion is unlikely to bias our results.

[21]The database is available at `http://www.cepii.fr/anglaisgraph/bdd/marketpotentials.htm`

[22]We are aware of the weaknesses of this kind of indicator raised by Glaeser *et al.* (2004), and only use it as a control variable, and do not infer anything from the sign or magnitude of the estimated coefficient. Besides, our sample mainly consists of OECD countries, so the issues raised by Glaeser *et al.* (2004) are unlikely to arise here. In addition, Table 8 replaces the Rule of Law Index by alternative measures of the political environment. We used the ICRG index, developed by the Political Risk Services Group (`http://www.prsgroup.com/Default.aspx`), and other indices developed by the World Bank: Political Stability, Quality of Regulation, and Accountability. Our results are not sensitive to the index choice. The indices are available on the WDI website (`http://data.worldbank.org/indicator`).

[23]Data are available at: `http://www.cepii.fr/francgraph/bdd/distances.htm`.

firms that export services to a given country also export goods to the same destination. Because exporting goods to a country may alleviate the cost induced by regulations when exporting services, we include a dummy variable taking the value 1 if the firm exports goods to the same market, and 0 otherwise.

Taking logs, and adding time subscripts $t$, the two estimated equations are:

$$\begin{aligned} ln(x_{odt}(a)) &= \beta_1 \ln(NMR_{dt}) + \beta_2 \ln(Demand_{dt}) + \beta_3 \ln(RMP_{dt}) \\ &\quad + \beta_4 \ln(RuleOfLaw_{dt}) + \beta_5 TradeCosts_{odt}(a) + \zeta_{at} + \varphi_{dt}(a), \end{aligned} \tag{8}$$

$$\begin{aligned} P[\Lambda_{od}(a) = 1] &= [\alpha_1 \ln(NMR_{dt}) + \alpha_2 \ln(Demand_{dt}) + \alpha_3 \ln(RMP_{dt}) \\ &\quad + \alpha_4 \ln(RuleOfLaw_{dt}) + \alpha_5 TradeCosts_{odt}(a) + \theta_{at} + \phi_{dt}(a) > \ln(\sigma F_{od})] , \end{aligned} \tag{9}$$

where the $o$ subscript is only for France. $ln(Demand_{dt})$ measures the demand for professional services in the destination market. $ln(RMP_{dt})$ is the real market potential, as calculated in Head and Mayer (2011). $ln(RuleOfLaw)$ is the Rule of Law Index from the World Development Indicator. $TradeCosts_{odt}(a)$ is a matrix whose vectors capture various dimensions of trade costs between France and an export market: the log geographic distance and three dummies indicating respectively French-speaking countries, whether the firm exports goods to the same market, and a firm-level border dummy variable. $\theta_{at}$ is a set of firm×year dummies. $\phi_{dt}(a)$ and $\varphi_{dt}(a)$ are error terms.

The estimation of Equation (8) is carried out using a generalized Tobit model. Indeed, the model predicts that we should not observe strictly positive export values below an exogenous cutoff value $\sigma F_d$. With such a cutoff, the export data are truncated and the OLS estimates are biased. A Tobit model should remove this bias, but the exact cutoff value is unobservable, and specific to each destination market. Eaton and Kortum (2001) show that an appropriate estimate of this censoring point is the minimum export value observed in each destination. Because this value changes across destinations, we use a generalized Tobit model[24].

In our sample, most of the firms export to a very small subset of countries, so that around 90% of all flows are actually zero. This is why the estimation of the export decision (Equation 9) is carried out using a firm-level conditional logit regression, instead of a linear probability model.[25]

Finally, with both equations, we regress the firm-level outcome on country×year variables. We therefore have to cluster our standard errors at the country×year level. However, with only 66 clusters, we may have too few clusters to get unbiased standard errors (Angrist and Pischke, 2009). Following Cameron *et al.* (2008) and Cameron and Trivedi (2009), one solution for this problem is to further bootstrap our clustered standard errors. This is what we do when estimating the export probability. Unfortunately, this solution is beyond

[24]Crozet *et al.* (2011) use a similar method and perform Monte Carlo simulations indicating that it successfully corrects the selection bias. See also Head and Mayer (2013) for details on the various estimation techniques for gravity equations at the firm level.

[25]Linear probability and logit models produce almost similar marginal effects when the average probability is around 50% (Angrist and Pischke, 2009).

computational capacities for the individual export equation, due to the large number of fixed effect we have to introduce in the generalized Tobit. For the estimates of equation (8), we will simply report clustered standard errors.

## 5.2 Baseline Results

Our baseline results are shown in Table (2). For each specification, we estimate both the export probability and the individual export sales. Before turning to the interpretation of our variable of interest, we check that the gravity variables are estimated with the expected sign and are significant at the 1% level in each regression.

Columns (1) and (2) show results using the simplest specification. We merely control for the usual gravity determinants of trade flows, and add our measure of regulations. Confirming previous evidence obtained on aggregate data (see Kimura and Lee 2006, Walsh 2006, Head *et al.* 2009), our firm-level regressions show that the gravity equation performs well in explaining international trade in services. In addition, the gravity variables have a comparable impact on both the export probability and the export sales. The higher the demand for professional services and the closer the country, the higher the exports of professional services by French firms. Exporters perform also better in francophone countries and when they are located in a border region.

Regarding our variable of interest – the $NMR_{dt}$ – we find that domestic regulations affect both the export probability and the individual export sales negatively. According to our theoretical predictions, this is consistent with the hypothesis that regulations act as an additional variable cost which discriminates against foreign firms. It is noteworthy that the coefficients reported in the table are not the marginal effects. They can easily be obtained by taking the exponential of the estimated coefficient and subtracting one. Hence, column 2 shows that an increase in the regulation would result in a decrease of individual export values by -6.60% ($0.660\% = e^{-1.079} - 1$). In a logit regression, coefficients have to be interpreted in terms of odds ratios, i.e. the probability of exporting over that of not exporting. All else being equal, increasing the regulation measure by 10% would reduce the odds ratio by 3.13% ($=(e^{0.375} - 1) \times 10$).

A concern with the results reported in columns (1) and (2) is that there might be a positive correlation, across countries, between discriminatory and non-discriminatory barriers. In this case, not controlling for discriminatory barriers would create an omitted variable bias. Our $NMR_{dt}$ variable would also capture the effect of the discriminatory regulations. A way to overcome this problem is to focus on intra-EU trade. Indeed, there cannot be any discriminatory barrier within the European Union. For these countries, we are sure that the $NMR_{dt}$ variable does not proxy for regulations that explicitly discriminate against French firms. In columns (3) and (4), we interact our measure of regulation with two dummies, therefore estimating the impact of regulations when a French firm is exporting to another EU country ($\ln(NMR_{dt}) \times EU$), and when it is exporting outside the EU ($\ln(NMR_{dt}) \times Non - EU$). The results offer a clear picture. The coefficients on $\ln(NMR_{dt}) \times EU$ are negative and statistically significant for both the export probability and the export sales. Moreover, they are not statistically different from the ones reported in columns (1) and (2). Even within the European Union, where member states are not allowed to discriminate against each other, we find that regulations in the professional services sectors act as *de jure*

discriminatory measures. These results confirm that the results of our baseline specification, in columns (1) and (2), are not driven by an omitted variable bias. In addition, the negative influence of domestic regulations on trade within the EU also suggests that the market unification is far from being completed in the European services markets.[26]

Table 2: The Impact of Market Regulations on Export Probability and Export Values

| | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Ln Local Demand | $0.924^a$ | $2.322^a$ | $0.932^a$ | $2.290^a$ |
| | (0.055) | (0.127) | (0.059) | (0.126) |
| Ln Distance | $-0.908^a$ | $-2.168^a$ | $-0.888^a$ | $-2.136^a$ |
| | (0.079) | (0.212) | (0.091) | (0.221) |
| Common Language | $0.809^a$ | $1.737^a$ | $0.886^a$ | $1.619^a$ |
| | (0.117) | (0.330) | (0.148) | (0.381) |
| Border | $1.158^a$ | $3.185^a$ | $1.165^a$ | $3.150^a$ |
| | (0.152) | (0.339) | (0.156) | (0.337) |
| Ln Market Potential | -0.006 | -0.021 | -0.016 | 0.015 |
| | (0.049) | (0.136) | (0.053) | (0.136) |
| Ln Rule of Law | -0.213 | -0.512 | -0.212 | -0.503 |
| | (0.219) | (0.511) | (0.227) | (0.514) |
| Export of Goods | $4.408^a$ | $7.546^a$ | $4.408^a$ | $7.528^a$ |
| | (0.226) | (0.400) | (0.226) | (0.391) |
| Ln NMR | $-0.375^a$ | $-1.079^a$ | | |
| | (0.112) | (0.336) | | |
| EU | | | 0.131 | -0.361 |
| | | | (0.217) | (0.541) |
| Ln NMR×EU | | | $-0.397^a$ | $-0.987^b$ |
| | | | (0.143) | (0.397) |
| Ln NMR×Non-EU | | | -0.324 | $-1.442^a$ |
| | | | (0.235) | (0.477) |
| Observations | 125,791 | 125,791 | 125,791 | 125,791 |
| Number of Firms | 4,594 | 4,594 | 4,594 | 4,594 |
| Pseudo R2 | 0.33 | 0.21 | 0.33 | 0.22 |

Significance levels: $^c$ $p < 0.1$, $^b$ $p < 0.05$, $^a$ $p < 0.01$. Columns (1) and (3) report export probability estimates, using a conditional logit with year×firm fixed effect, and bootstrapped standard errors clustered at the country×year level (200 replications). Columns (2) and (4) report individual export estimates, using a generalized Tobit with year and firm fixed effect, standard errors are clustered at the country×year level. All variables, but the dummies, are in logs. NMR measures the level of regulation in Professional Services in the destination country.

[26]The coefficients on $\ln(NMR_{dt}) \times Non - EU$ and $\ln(NMR_{dt}) \times EU$ are not statistically different from each other. The difference in the significance level in column (3) is driven by a lack of variance within the non-EU group of countries (only 10 countries in our sample are not EU members).

# 6 Robustness to Alternative Specifications

Table (3) shows several robustness checks.

First, in columns (1) and (2), we estimate a non-parametric relationship between trade performances and domestic regulations. We replace the variable $\ln(NMR_{dt})$ by a set of dummies characterizing each quartile of the distribution of the $NMR$ variable.[27]. In 2003, countries in the first quartile (Q1 – countries with low levels of regulations), were Australia, Switzerland, Denmark, Finland, the United Kingdom, Sweden and the United States, while in the top quartile, we found Austria, Canada, Germany, Greece, Italy and Slovakia. The results indicate that the influence of domestic regulations is non-linear. In both columns (1) and (2), the results indicate that firms exporting to highly-regulated countries are more discriminated against (in countries with an $NMR_{dt}$ greater than 2.7).[28]

Second, we examine in columns (3) to (6) the specific case of firms which have some activity in manufacturing production. In the Banque de France database, about 14% of exporters of professional services are registered as manufacturing firms. Moreover, matching the Banque de France database with the French customs one, reveals that 11% of the service firms in our sample that export professional services to a country also export goods to the same destination. These figure suggest that trade in professional services and trade in goods might be linked and determined jointly by complex supply or production strategies that might affect our results. Indeed, a manufacturing firm may supply a professional service as a support for or a complement to the manufacturing goods sold to foreign customers (a producer of construction goods may also provide architectural services, producers of machinery may offer engineering services, producers of electronic goods may also sell the companion software, etc). In this case, the services exports would be, to a certain extent, disconnected from any market behavior in the services sectors. And even if the two activities are completely disconnected, firms exporting manufacturing goods to a country might have a better knowledge of the foreign market and develop their cross-border networks, therefore improving their ability to comply with regulations in the foreign services markets. We thus expect the $NMR$ variable to have a smaller impact on the exports of services by firms whose activity has to do with both manufacturing and services. We perform two different tests. In columns (3) and (4), we use our sample of firms which have their main activity in a service sector, and interact our measure of regulation with the status of exporter of goods to the same destination. The results confirm that exporters are less sensitive to regulations when they also export goods. The coefficient is non-significant on $NMR \times Export\ of\ goods$, while it is negative and significant on $NMR \times No\ export\ of\ goods$. For firms that only export services, the impact of domestic regulation on trade is very similar to the one reported in Table (2). A 10% difference in regulations between two countries reduces the odds of exporting to the high-regulation country by 3.16%, while exports fall by 6.75%.[29] The second

[27]The definition of the quartiles is invariant over time and is based on the distribution of the $NMR$ variable in 2003. In the first quartile – Q1 – we find countries with an $NMR \in [0; 1.8]$, in the second quartile, countries with an $NMR \in ]1.8; 2.7]$, in the third quartile, $NMR \in ]2.7; 3.2]$, and countries in the fourth quartile have an $NMR$ greater than 3.2

[28]The non-significant results on $NMR - Q2$ do not mean that firms are not discriminated against in these markets. They simply mean that firms exporting to countries with low levels of regulation – in $NMR - Q1$ or $NMR - Q2$ – are affected by regulations in the same way.

[29]The interpretation of the results in columns (3) and (4) is not straightforward. The coefficients on

test is reported in columns (5) and (6). Here, we replicate the regressions in columns (3) and (4) on a completely different sample of firms. We now consider the exporters of professional services registered in the manufacturing sector, which are excluded from our baseline sample. The gravity variables give us the usual results, but we find non-significant coefficients on $NMR_{dt}$, both on the export probability and the export sales. This result corroborates the one shown in columns (3) and (4).

We further assess the robustness of our results by running additional sets of regressions. The results are presented in the appendix in Tables (6), (7) and (8). Table (6) estimates the impact of the two components of the $NMR$ index: $NMR - Entry$, and $NMR - Conduct$. The Entry component focuses on regulations that prevent firms from entering the market. The Conduct component focuses on regulations that complicate the day-to-day business. As mentioned before, both components are highly correlated with each other (Figure 3). Given that countries usually have Entry and Conduct regulations that go hand in hand, it is not surprising to find our baseline results confirmed. In columns (1) and (2) of Table (7), we estimate a more standard gravity equation, replacing the demand for professional services in the destination market by the GDP of the importing country. Again, the results confirm our previous conclusion, and prove that our main result is not driven by a correlation between the level of regulations in the destination market and the demand for professional services in the country. Interestingly, the coefficient on $NMR_{dt}$ is slightly larger than the one reported in Table (2), which is the expected effect.[30] Indeed, since regulations in a sector are likely to hamper its development, the share of professional services in GDP should be lower in countries with a higher level of regulations of service activities. Then, by using GDP as a measure of market size, one does not properly control for the impact of regulation on demand, and thus overestimates its impact on trade flows. In columns (3) to (8), we add several control variables. In a recent paper, Fillat-Castejon *et al.* (2008) found a positive correlation between FDI outflows and cross-border exports of services. Because restrictions on FDI in the destination country may also reduce cross-border trade while being correlated with market regulations, our econometric results might be affected by an omitted variable bias. Columns (3) and (4) include a measure of restriction on FDI. This index comes from the same OECD database as the $NMR$ index, and ranges from 0 (no restriction) to 6 (high restrictions). Our results change very little and remain statistically significant when we include this additional control. However, we do not find evidence that restrictions on FDI hamper the exports of professional services. In columns (5) and (6), we control for the similarity in the legal system. The legal systems influence the enforcement of contracts, which are the mainstay of any international transaction, and the presence of a common legal system is known as an important factor influencing international trade flows (see for example Nunn, 2007). To

$NMR \times No\ export\ of\ goods$ confirm that the $NRM$ captures discriminatory regulations which exclude some foreign suppliers from the market, thereby reducing the competitive pressure. In this case, local firms, and all incumbent suppliers incurring the same regulation cost, should sell relatively more when the $NMR$ is higher. Therefore, if French exporters of goods were not discriminated against, we should have a positive coefficient on $NMR \times Export\ of\ goods$ in column (4). Instead, the non-significant coefficient suggests that they are less affected by regulations than the firms which solely export services, but more than the local producers.

[30] A 10% increase in regulations between two countries now decreases the odds of exporting to the high-regulation country by 4.18%, and individual export sales by 7.8%.

Table 3: The Impact of Market Regulations on Export Probability and Export Values: Robustness Checks

| | Service Sector | | | | Manufacturing Sector | |
|---|---|---|---|---|---|---|
| | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Ln Local Demand | $0.940^a$ | $2.283^a$ | $0.924^a$ | $2.324^a$ | $0.638^a$ | $1.024^a$ |
| | (0.064) | (0.130) | (0.055) | (0.127) | (0.049) | (0.080) |
| Ln Distance | $-0.965^a$ | $-2.180^a$ | $-0.908^a$ | $-2.169^a$ | $-0.456^a$ | $-0.653^a$ |
| | (0.076) | (0.173) | (0.079) | (0.213) | (0.080) | (0.148) |
| Common Language | $0.741^a$ | $1.743^a$ | $0.810^a$ | $1.743^a$ | $0.413^a$ | $0.491^b$ |
| | (0.119) | (0.32) | (0.117) | (0.329) | (0.158) | (0.194) |
| Border | $1.150^a$ | $3.175^a$ | $1.160^a$ | $3.195^a$ | $0.795^c$ | $1.363^a$ |
| | (0.158) | (0.340) | (0.152) | (0.337) | (0.460) | (0.388) |
| Ln Market Potential | -0.055 | -0.052 | -0.006 | -0.012 | 0.037 | 0.057 |
| | (0.057) | (0.136) | (0.049) | (0.136) | (0.056) | (0.099) |
| Ln Rule of Law | -0.215 | -0.579 | -0.213 | -0.514 | -0.178 | -0.149 |
| | (0.213) | (0.484) | (0.218) | (0.514) | (0.146) | (0.305) |
| Export of Goods | $4.403^a$ | $7.500^a$ | $4.041^a$ | $6.684^a$ | $6.158^a$ | $11.04^a$ |
| | (0.226) | (0.403) | (0.340) | (0.536) | (0.351) | (0.300) |
| NMR-Q2 | -0.051 | -0.596 | | | | |
| | (0.169) | (0.364) | | | | |
| MNR-Q3 | $-0.337^b$ | $-1.432^a$ | | | | |
| | (0.151) | (0.354) | | | | |
| NMR-Q4 | $-0.491^a$ | $-1.365^a$ | | | | |
| | (0.135) | (0.304) | | | | |
| NMR x Export of goods | | | 0.103 | 0.111 | -0.141 | -0.240 |
| | | | (0.310) | (0.596) | (0.215) | (0.263) |
| NMR x No export of goods | | | $-0.381^a$ | $-1.125^a$ | -0.145 | -0.227 |
| | | | (0.113) | (0.337) | (0.146) | (0.225) |
| Observations | 125,791 | 125,791 | 125,791 | 125,791 | 31,074 | 31,074 |
| Number of Firms | 4,594 | 4,594 | 4,594 | 4,594 | 1,142 | 1,142 |
| Pseudo R2 | 0.12 | 0.22 | 0.33 | 0.22 | 0.68 | 0.39 |

Significance levels: $^c$ $p < 0.1$, $^b$ $p < 0.05$, $^a$ $p < 0.01$. Columns (1), (3) and (5) report export probability estimates, using a conditional logit with year×firm fixed effect, and bootstrapped standard errors clustered at the country×year level (200 replications). Columns (2), (4) and (6) report individual export estimates, using a generalized Tobit with year and firm fixed effect, standard errors are clustered at the country×year level. Columns (1)-(4) use the sample of exporters registered in services sectors only. Columns (5) and (6) use a sample of exporters of professional services registered in manufacturing. All variables, but the dummies, are in logs. NMR measures the level of regulation in Professional Services in the destination country.

make sure that the measure of regulation we use is not somehow capturing this dimension, we introduce a dummy variable which takes the value 1 if the importing country shares the same

legal origin as France[31], and 0 otherwise. Following the same procedure as in the baseline, we also interact $NMR_{dt}$ with this common-legal-system dummy. Data on common legal systems are from La Porta *et al.* (1999). The results in columns (5) and (6) show that after controlling for the usual determinants of trade flows, French exporters are not more likely to export to countries sharing a common legal system with France. However, the results on the regulation variables suggest that discrimination against French exporters is higher in countries which do not share a common legal history with France. Columns (7) and (8) of Table (7) perform a comparable exercise with the common language dummy variable: we interact the $NMR$ variable with a common-language dummy, and with a no-common-language dummy.[32] We find that linguistic proximity reduces the impact of domestic regulations significantly. All together, the results in columns (5)-(8) show that domestic regulations are less burdensome for foreign firms when they are more easily understandable and produced by a legal system closer to that of the exporting country. They suggest that the discriminatory effect we estimate is partly involuntary, and simply results from the difficulty for foreign suppliers to deal with heterogenous legal environments. Finally in table 8, we present specifications using different measures for the overall business environment. We alternatively replace the Rule of Law Index by the ICRG index, and by three different indicators from the World Development Indicator (WDI): the "Political Stability" index, the "Quality of Regulation" index and the " Voice and Accountability" index. The results show that our choice of index has little consequence, as the results remain very similar.

# 7 Robustness to Alternative Hypotheses

We acknowledge that our identification of the discriminating nature of market regulation relies on the prediction of a very specific model. Our baseline model assumes CES preferences and ad valorem regulation costs, which has important consequences on our theoretical predictions. More specifically, these two assumptions involve that the direct and indirect effects of a non-discriminating regulation, shown in Equation (5), cancel each other out. In this section, we consider two extensions of our model, in which we relax these specific assumptions. These two extensions lead to less clear-cut predictions on the impact of discriminatory and non-discriminatory market regulations. But they also predict that the elasticity of the exports by firms with respect to the level of regulations should not be the same for all firms. We show below that our data provide very little evidence in favor of this additional prediction, which comforts our initial modeling choices.

## 7.1 Non-Ad Valorem Cost of Regulations

Let us first consider the case where complying with the market regulations in the destination country involves a per unit cost rather than an iceberg (ad valorem) one. The cost of delivering one unit of service in country $d$ now differs from Equation (3). If we assume, without loss of generality, $t_{od} = 1$, the delivered price is $p_{od}(a) = p_o(a) + B_d^\gamma$. Then, the profit maximizing price charged by the producer is, as in Martin (2012), $p_o(a) = [B_d^\gamma +$

[31]Countries which do are Belgium, Spain, Greece, Italy, the Netherlands and Portugal

[32]French is an official language in only three countries in our sample: Belgium, Canada and Switzerland.

$\sigma c(a)]/(\sigma-1)$, where $c(a)$ denotes the marginal cost of a firm with ability $a$. The export revenue is $x_{od}(a) = p_{od}(a)^{1-\sigma}(E_d/\tilde{\Phi}_d)\Lambda_{od}(a)$, where $\tilde{\Phi}_d$ is the component of the CES price index that captures the competition pressure in country $d$, when one assumes the non-ad valorem costs of regulations. The elasticity of firm-level exports with respect to market regulation in the destination country can be shown to be:

$$\vartheta_b^x = \left[\frac{\gamma B_d^\gamma(1-\sigma)}{B_d^\gamma + c(a)} - \frac{\partial\tilde{\Phi}_d}{\partial B_d}\frac{B_d}{\tilde{\Phi}_d}\right]. \tag{10}$$

Again, we find our direct and indirect effects of market regulations. As for an ad valorem cost, the direct effect is clearly negative while the indirect one, channeled by the price index, is positive. The most important difference with the elasticity shown in Equation (5) is that the direct effect is now specific to each firm. The indirect effect being the same for all firms, we have $\partial\vartheta_b^x/\partial c(a) > 0$. In other words, when the cost of regulation is per unit rather than ad valorem, it has a greater marginal impact on the exports by firms producing cheaper varieties (i.e. the ones with a lower marginal cost $c(a)$).

## 7.2 Flexible Mark-Ups

Now, we relax the assumption of the CES preferences and consider a linear demand model, as in Melitz and Ottaviano (2008). Again, we neglect the delivering cost, setting $t_{od} = 1$. The cost of supplying a service in country $d$, for a firm located in country $o$ with a marginal cost of production, $c(a)$, is $c_{od}(a) = c(a)B_d^\gamma$. In a Melitz and Ottaviano (2008) framework, the revenue of the firm is $x_{do}(a) = A_d\left[c_d^2 - [B_d^\gamma c(a)]^2\right]$, where $A_d$ is an exogenous parameter, and $c_d$ is the cost cutoff value in market $d$. Of course, the latter includes the cost of regulation. As in the other models, we can compute the elasticity of sales with respect to market regulations:

$$\upsilon_B^x = 2\left[-\frac{\gamma[B_d^\gamma c(a)]^2}{c_d^2 - [B_d^\gamma c(a)]^2} + \frac{c_d^2}{c_d^2 - [B_d^\gamma c(a)]^2}\varepsilon_B^{c_d}\right], \tag{11}$$

where $\varepsilon_B^{c_d}$ is the elasticity of the cutoff value $c_d$ with respect to the market regulations, $B_d$. Again, a change in the level of regulations has both a direct effect and an indirect one through the change in competition pressure on market $d$, represented in Equation (11) by the cutoff value $c_d$. However, this model is more complex since the magnitude of the two effects now varies with the marginal cost of the firm. As in the case of a non-ad valorem cost, we can compute the derivative of this elasticity with respect to $c(a)$:

$$\frac{\partial\upsilon_B^x}{\partial c(a)} = c(a)\frac{4(B_d^\gamma c_d)^2}{[c_d^2 - (B_d^\gamma c(a))^2]^2}(\varepsilon_B^{c_d} - \gamma). \tag{12}$$

Here too, the marginal impact of market regulations on the exports by firms should vary with their ability. Whether the impact of market regulations increases or decreases with $c(a)$ depends on the sign of the difference between $\varepsilon_B^{c_d}$ and $\gamma$. This difference depends on the distribution of the cost draw. But it is very likely that $(\varepsilon_B^{c_d} - \gamma) < 0$. For example, with a Pareto distribution and a non-discriminatory regulation, we have $\varepsilon_B^{c_d} = \gamma k/(k+2)$, where

$k$ is the shape parameter of the Pareto distribution.[33] Then, with $\frac{\partial v_B^x}{\partial c(a)} < 0$, the impact of market regulations is stronger for firms with a higher marginal cost.

## 7.3 Empirical Verification of a Differentiated Impact of Regulation across Firms

The two extensions presented above give opposite conclusions. With a non-ad valorem cost, the cost induced by regulations makes up a higher share of the delivering price for firms with a low marginal cost. Therefore, market regulations have a greater marginal impact on the trade performances of the most competitive firms. With non-CES preferences, firms have a flexible mark-up and have a dumping strategy. As a consequence, more competitive firms tend to absorb the regulation cost in their markups, making their export performances less sensitive. By contrast, our baseline model, with the ad valorem cost and CES, predicts that the marginal impact of market regulation on individual exports is the same for all firms. In the following, we test whether the marginal impact of regulations varies across firms, in order to discriminate between the different models. To do so, we rank all firms according to the value of their exports of professional services, and assign each firm to its corresponding decile in the distribution. We run our baseline regression for each decile of the distribution.[34]

Figure 5: Differentiated Impact of Regulations across Firms

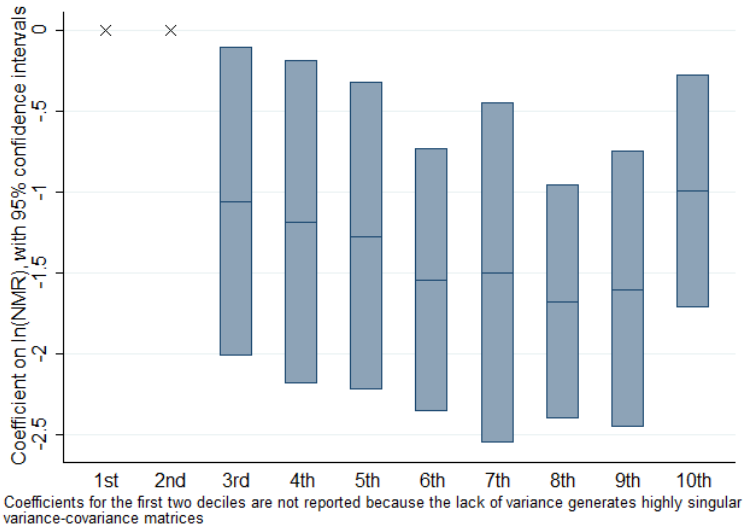



Figure (5) shows graphically the estimated coefficients on the $NMR$ variable, with the corresponding 95% confidence interval.[35] The coefficients for the first two deciles of the distribution are not reported because the lack of variance generates highly singular variance-covariance matrices.[36] Figure 5 delivers a plain message: the effect of regulations is not sta-

[33] Note that with a discriminatory regulation ($\kappa < \gamma$), we have $\varepsilon_B^{c_d} < \gamma k/(k+2)$.

[34] To avoid a composition bias across deciles, we focus on firms exporting services only.

[35] We do not report the other coefficients as they are very similar in terms of magnitude and level of significance to those reported in table (2).

[36] In these deciles, firms export to very few destinations.

tistically different across the decile distribution, which comforts our initial modeling choices.

# 8 Regulations as Fixed Costs?

The previous sections have shown that domestic regulations involve a higher marginal cost for foreign suppliers of services and tend to reduce cross-border exchanges, as tariffs do. But, they are silent on whether domestic regulations involve a fixed cost too.

A simple way to investigate this question is to test the impact of regulations on an explicit proxy for the fixed cost of exporting to each destination country. As in our generalized Tobit estimation, we use the minimum export value to a destination market observed in our data as a proxy for the fixed cost of exporting to this market. In Table (4), we regress this proxy on our measure of regulations, controlling for distance and local demand. Observations are at the country×year level, which leaves us with 66 observations. To assess the robustness of our results and avoid measurement errors, we use three alternative proxies for the fixed cost.

The first line (Min 1) takes the minimum export value observed in each destination market. The second and third lines (Min 2 and Min 3) take the average of the two smallest export flows, in order to alleviate the consequences of misreporting trade flows or exceptionally low values of exports by some firms.[37] In the second line (Min 2), we restrict our sample to firms which only export services. We saw in the previous section that firms which export goods are less sensitive to regulations than firms that do not. Therefore, a small export value can be driven by the fact that the firm also exports goods to the same market. In the third line (Min 3), we further limit a possible bias due to the presence of firms that export to so many countries that they enjoy the benefits of economies of scope in complying with market regulations. We focus on small firms only, restricting the sample to firms which export on aggregate less than the median firm.

The results show that the $NMR$ and its two components ($NMR - Entry$ and $NMR - Conduct$) are not significantly correlated with the minimum export value.[38] We do not find evidence that regulations contribute to increasing the fixed cost of exporting.

# 9 Conclusion

Trade in services is growing but remains a small fraction of world trade. Our data on French firm exports of professional services show that very few firms are able to enter the export market, and that exports are highly concentrated among very few firms. Trade barriers are significant, and domestic regulations in service sectors are often mentioned by foreign suppliers as an important barrier, even when these barriers do not explicitly discriminate against them.

We investigate this idea by looking at the impact of domestic regulations on the exports of professional services by French firms. Our results show that non-discriminatory barriers – regulations that affect all firms equally regardless of their nationality – affect both the export

[37] We also experimented with the second lowest value of export flows. The results are very similar.

[38] We only show the results for the regulation variable. As expected, distance is positively correlated and local demand negatively correlated with the minimum export value.

Table 4: The Impact of Regulation on the Minimum Export Value

| | NMR | NMR-Entry | NMR-Conduct |
|---|---|---|---|
| Dependant variable | (1) | (2) | (3) |
| Min 1 | 0.057 | -0.002 | -0.000 |
| | (0.257) | (0.173) | (0.119) |
| Min 2 | -0.018 | -0.002 | -0.000 |
| | (0.183) | (0.173) | (0.119) |
| Min 3 | -0.009 | -0.002 | -0.000 |
| | (0.176) | (0.173) | (0.119) |
| Fixed-effect | year | year | year |
| Number of Observations | 66 | 66 | 66 |

Significance levels: $^{c}$ $p < 0.1$, $^{b}$ $p < 0.05$, $^{a}$ $p < 0.01$. Min 1 is the minimum of the whole sample. Min 2 and Min 3 are the average of the two lowest values. For Min 2, we restrict the sample to firms exporting services only. For Min 3, we further restrict the sample to firms exporting less than the median firm. Controls include distance and local demand. All variables are taken in logs.

decision and the individual export sales of French firms. Using a simple model of international trade, we show that this is consistent with domestic regulations discriminating against foreign suppliers. Foreign suppliers are more sensitive than domestic firms to the same regulations. Our results still hold when looking at the exports by French firms within the European Union, where regulations cannot discriminate against suppliers from another member state. These findings provide an interesting insight into the multilateral trade negotiations taking place at the World Trade Organization. While members stress the importance of market access as a stepping stone for further liberalization, our results indicate that an important determinant of trade patterns lies in domestic regulations. Our results suggest that more attention should be paid to Article VI of the GATS related to domestic regulations, as far as the promotion of world trade in services is concerned.

# References


Ariu A. (2012), "Services versus goods trade: Are they the same?", *National Bank of Belgium Working Paper Research*, 237.

Anderson J.E. and van Wincoop E. (2003), "Gravity with Gravitas: A Solution to the Border Puzzle", *American Economic Review*, vol.93(21), pages 170-192.

Angrist J.D. and J-S. Pischke (2008), *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton University Press.

Arnold J., G. Nicoletti and S. Scarpetta (2008), "Regulation, Allocative Efficiency and Productivity in OECD Countries: industry and firm-level evidence", *OECD working paper*, 616.

Barone G. and F. Cingano (2011), "Service Regulation and Growth: Evidence from OECD Countries", *The Economic Journal*, vol.121(555), pages 931-957.

Bernard A.B., J.B. Jensen, S.J. Redding and P.K. Schott (2007), "Firms in International Trade", *Journal of Economic Perspectives*, vol.21(3), pages 105-130.

Bhagwati J., A. Panagariya and T.N. Srinivasan (2004), "The Muddles over Outsourcing", *Journal of Economic Perspectives*, vol.18(4), pages 93-114.

Blanchard O. and F. Giavazzi (2003), "Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Market", *The Quarterly Journal of Economics*, vol.118(3), pages 879-907.

Bourles R., G. Cette, J. Lopez, J. Mairesse and G. Nicoletti (2013), "Do Product Market Regulations in Upstream Sectors Curb Productivity Growth? Panel Data Evidence for OECD Countries", *Review of Economics and Statistics*, forthcoming.

Borchert I., B. Gootiiz and A. Mattoo (2012), "Policy Barriers to International Trade in Services : Evidence from a New Database",*World Bank, Policy Research Working Paper Series*, 6109.

Breinlich H. and C. Criscuolo (2011), "International Trade in Services: A Portrait of Importers and Exporters", *Journal of International Economics*, vol.84(2), pages 188-206.

Cameron A.C., J.G. Gelbach and D.L. Miller (2008), "Bootstrap-Based Improvements for Inference with Clustered Errors", *Review of Economics and Statistics*, vol.90(3), pages 414-427.

Cameron A.C., and P.K. Trivedi (2009), *Microeconometrics using Stata*, College Station, TX, Stata Press.

Conti G., A. Lo Turco and D. Maggioni (2010), "Exporters in Services: new Evidence from Italian Firms"', *Applied Economics Quarterly*, vol.56(1), pages 73-98.

Conway P. and G. Nicoletti (2006), "Product Market Regulation in the Non-manufacturing Sectors of OECD Countries: Measurement and Highlights", *OECD Working Paper*, 530.

Crozet M., K. Head and T. Mayer (2011), "Quality Sorting and Trade: Firm-level Evidence for French Wine", *Review of Economic Studies*, vol.79(2), pages 609-644.

Deardorff A. V. and R. M. Stern (2008), "Empirical Analysis of Barriers to International Services Transactions and the Consequences of Liberalization"', *University of Michigan Working Papers*, 505.

Eaton J. and S. Kotum (2001), "Trade in Capital Goods", *European Economic Review*, vol.45(7), pages 1195-1235.

Eaton J., S. Kortum and F. Kramarz (2004), "Dissecting Trade: Firms, Industries, and Export Destinations", *American Economic Review Papers and Proceeding*, vol.94(2), pages 150-154.

Fillat-Castejon C., J. Francois and J. Woerz (2008), "Trade trough FDI: Investing in Services", *IIDE Discussion Papers*, 2008-0502.

Findlay C. and F. Warren (2000), *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge: London.

Francois J. and B. Hoekman (2010), "Services Trade and Policy", *Journal of Economic Literature*, vol.48(3), pages 642-92.

Glaeser E.L., R. La Porta and F. Lopez-de-Silanes (2004), "Do Institutions Cause Growth?", *Journal of Economic Growth*, vol.9(3), pages 271-303.

Head K. and T. Mayer (2011), "Gravity, Market Potential and Economic Development", *Journal of Economic Geography*, vol.11(2), pages 281-294.

Head K. and T. Mayer (2013), "Gravity Equations: Workhorse, Toolkit, and Cookbook", *CEPR Discussion Paper*, 9322.

Head K., T. Mayer and J. Ries (2009), "How Remote is the Offshoring Threat?", *European Economic Review*, vol.53(4), pages 429-444.

Hoekman B. (2006), "Liberalizing Trade in Services: A Survey", *World Bank Policy Research Working Paper*, 4030.

Hoekman B. and A. Mattoo (2011), "Services Trade Liberalization and Regulatory Reform: Re-invigorating International Cooperation", *The World Bank Policy Research Working Paper Series*, 5517.

Jean S. and G. Nicoletti (2004), "Regulation and Wage Premia", *CEPII Working Paper*, 2004-12.

Kelle M. and J. Kleinert (2010), "German Firms in Service Trade", *Applied Economics Quarterly*, vol.56(1), pages 51-72.

Kimura F. and H-H. Lee (2006), "The Gravity Equation in International Trade in Services", *Review of World Economics*, vol.142(1), pages 92-112.

Kox H. and A. Lejour (2005), "Regulatory Heterogeneity as Obstacle for International Services Trade", *CPB Discussion Paper*, 49.

Kox H. and H. K. Nordas (2007), "Services Trade and Domestic Regulation", *OECD Trade Policy Working Papers*, 49.

La Porta R., F. Lopez-de-Silanes, A. Shleifer and R. Andrei (1999), "The Quality of Government", *Journal of Law, Economics and Organization*, vol.15(1), pages 222-279.

Lennon C., D. Mirza and G. Nicoletti (2009), "Complementarity of Inputs in Services Trade", *Annales d'Economie et de Statistiques*, N.93-94.

Martin J. (2012), "Mark-ups, Quality and Transport Costs", *European Economic Review*, vol.56(4), pages 777-791.

Mattoo A. and D. Mishra (2008), "Foreign Professionals and Domestic Regulations", *World Bank Policy Research Working Paper Series*, 4782.

Melitz M. and G. Ottaviano (2008), "Market Size, Trade and Productivity", *Review of Economic Studies*, vol.75(1), pages 295-316.

McCallum J. (1995), "National Borders Matter: Canada-U.S. Regional Trade Patterns", *American Economic Review*, vol.85(3), pages 615-23.

Nicoletti G. and S. Scarpetta (2003), "Regulation, Productivity and Growth: OECD Evidence", *Economic Policy*, vol.18(36), pages 9-72.

Nunn, N. (2007), "Relationship-Specificity, Incomplete Contracts and the Pattern of Trade", *The Quarterly Journal of Economics*, vol.122(2), pages 569-600.

Schwellnus C. (2007), "The Effect of Domestic Regulation on Service Trade Revisited", *CEPII Working Paper*, 2007-08.

Tuckey, J. W. (1977), *Exploratory Data Analysis*, Pearson.

Van Der Marel, E. and B. Shepherd (2011), "Services Trade, Regulation, and Regional Integration: Evidence from Sectoral Data", *MPRA Paper*, 34343.

Walsh K. (2006), "Trade in Services: Does Gravity Hold? A Gravity Model Approach to Estimating Barriers to Trade in Services", *The Institute for International Integration Studies Discussion Paper Series*, 183.

Walter P. and R. Dell'mour (2010), "Firm-level Analysis of International Trade in Services", *IFC Working Paper*, 4.

Wolfl A., I. Wanner, T. Kozluk and G. Nicoletti (2009), "Ten Years of Product Market Reform in OECD Countries: Insights from a Revised PMR Indicator", *OECD Economics Department Working Papers*, 695.

# Appendix

Table 5: List of Countries and Years Available

| Iso code | Country | Years |
|---|---|---|
| AT | Austria | 1999, 2003, 2007 |
| AU | Australia | 1999, 2003 |
| BE | Belgium | 2003, 2007 |
| CA | Canada | 1999, 2003 |
| CH | Switzerland | 1999, 2003, 2007 |
| CZ | Czech Republic | 2003, 2007 |
| DE | Germany | 1999, 2003, 2007 |
| DK | Denmark | 1999, 2003, 2007 |
| EE | Estonia | 2007 |
| ES | Spain | 1999, 2003, 2007 |
| FI | Finland | 1999, 2003, 2007 |
| GB | United Kingdom | 1999, 2003, 2007 |
| GR | Greece | 1999, 2003, 2007 |
| HU | Hungary | 2003, 2007 |
| IE | Ireland | 2007 |
| IL | Israel | 2007 |
| IS | Iceland | 2003, 2007 |
| IT | Italy | 1999, 2003, 2007 |
| JP | Japan | 1999, 2003, 2007 |
| KR | South Korea | 2003, 2007 |
| NL | Netherlands | 1999, 2003, 2007 |
| NO | Norway | 1999, 2003, 2007 |
| NZ | New Zealand | 1999, 2003 |
| PL | Poland | 2003 |
| PT | Portugal | 1999, 2003 |
| SE | Sweden | 1999, 2003, 2007 |
| SK | Slovakia | 2003, 2007 |
| US | United States | 1999, 2003, 2007 |

Table 6: Dissecting the $NMR$ Index: Impact on Export Probability and Export Values

| | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Ln Local demand | $0.922^a$ | $2.318^a$ | $0.924^a$ | $2.315^a$ |
| | (0.060) | (0.130) | (0.049) | (0.122) |
| Ln Distance | $-0.893^a$ | $-2.132^a$ | $-0.948^a$ | $-2.282^a$ |
| | (0.089) | (0.236) | (0.062) | (0.194) |
| Common language | $0.753^a$ | $1.590^a$ | $0.913^a$ | $2.020^a$ |
| | (0.150) | (0.351) | (0.100) | (0.300) |
| Border | $1.121^a$ | $3.108^a$ | $1.179^a$ | $3.252^a$ |
| | (0.145) | (0.331) | (0.160) | (0.345) |
| Ln market potential | -0.015 | -0.037 | -0.012 | 0.012 |
| | (0.053) | (0.140) | (0.041) | (0.122) |
| Ln Rule of law | -0.061 | -0.063 | -0.179 | -0.451 |
| | (0.213) | (0.495) | (0.207) | (0.480) |
| Export of goods | $3.831^a$ | $6.255^a$ | $4.372^a$ | $7.493^a$ |
| | (0.361) | (0.523) | (0.242) | (0.356) |
| Ln NMR-Entry×Export of goods | 0.271 | 0.558 | | |
| | (0.293) | (0.531) | | |
| Ln NMR-Entry×No export of goods | $-0.269^b$ | $-0.769^b$ | | |
| | (0.136) | (0.343) | | |
| Ln NMR-Conduct×Export of goods | | | 0.075 | -0.069 |
| | | | (0.254) | (0.450) |
| Ln NMR-Conduct×No export of goods | | | $-0.229^a$ | $-0.728^a$ |
| | | | (0.065) | (0.173) |
| Obs. | 125,791 | 125,791 | 125,791 | 125,791 |
| Nb Firms | 4,594 | 4,594 | 4,594 | 4,594 |
| Pseudo R2 | 0.33 | 0.22 | 0.33 | 0.22 |

Significance levels: $^c$ $p < 0.1$, $^b$ $p < 0.05$, $^a$ $p < 0.01$. Columns (1) and (3) report export probability estimates, using a conditional logit with year×firm fixed effect, and bootstrapped standard errors clustered at the country×year level (200 replications). Columns (2) and (4) report individual export estimates, using a generalized Tobit with year and firm fixed effect, standard errors are clustered at the country×year level. All variables, but the dummies, are in logs. NMR measures the level of regulation in Professional Services in the destination country.

Table 7: Further Controls: Impact on Export Probability and Export Values

| | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Ln GDP | $1.056^a$ | $2.656^a$ | | | | | | |
| | (0.063) | (0.148) | | | | | | |
| Ln Demand | | | $0.908^a$ | $2.270^a$ | $0.941^a$ | $2.292^a$ | $0.927^a$ | $2.322^a$ |
| | | | (0.055) | (0.129) | (0.071) | (0.158) | (0.055) | (0.127) |
| Ln Distance | $-0.961^a$ | $-2.314^a$ | $-0.881^a$ | $-2.084^a$ | $-0.893^a$ | $-2.081^a$ | $-0.918^a$ | $-2.172^a$ |
| | (0.095) | (0.257) | (0.077) | (0.219) | (0.095) | (0.232) | (0.084) | (0.230) |
| Com. lang. | $0.901^a$ | $2.003^a$ | $0.842^a$ | $1.844^a$ | $0.797^a$ | $1.637^a$ | $0.729^b$ | $1.704^a$ |
| | (0.170) | (0.385) | (0.110) | (0.305) | (0.141) | (0.370) | (0.352) | (0.636) |
| Border | $1.106^a$ | $3.096^a$ | $1.168^a$ | $3.221^a$ | $1.131^a$ | $3.140^a$ | $1.166^a$ | $3.188^a$ |
| | (0.155) | (0.347) | (0.156) | (0.341) | (0.159) | (0.342) | (0.155) | (0.327) |
| Ln Market pot. | 0.065 | 0.154 | -0.010 | -0.027 | -0.021 | 0.053 | -0.013 | -0.014 |
| | (0.057) | (0.143) | (0.047) | (0.135) | (0.091) | (0.206) | (0.050) | (0.140) |
| Ln Rule of law | 0.033 | 0.133 | -0.251 | -0.675 | 0.077 | 0.156 | -0.215 | -0.514 |
| | (0.203) | (0.473) | (0.200) | (0.460) | (0.259) | (0.585) | (0.221) | (0.514) |
| Export of goods | $4.062^a$ | $6.734^a$ | $4.056^a$ | $6.706^a$ | $4.395^a$ | $7.532^a$ | $4.409^a$ | $7.547^a$ |
| | (0.342) | (0.537) | (0.336) | (0.460) | (0.225) | (0.397) | (0.227) | (0.399) |
| Ln NMR | -0.098 | -0.292 | 0.110 | 0.183 | | | | |
| ×Goods | (0.316) | (0.600) | (0.307) | (0.609) | | | | |
| Ln NMR | $-0.529^a$ | $-1.514^a$ | $-0.348^a$ | $-1.041^a$ | | | | |
| ×No-Goods | (0.130) | (0.355) | (0.121) | (0.339) | | | | |
| Ln FDI restr. | | | -0.073 | -0.292 | | | | |
| | | | (0.080) | (0.203) | | | | |
| Com. legal | | | | | -0.026 | -0.712 | | |
| | | | | | (0.456) | (1.040) | | |
| Ln NMR | | | | | -0.100 | -0.070 | | |
| ×Legal | | | | | (0.405) | (0.912 | | |
| Ln NMR | | | | | $-0.403^a$ | $-1.172^a$ | | |
| ×No-Legal | | | | | (0.123) | (0.346) | | |
| Ln NMR | | | | | | | -0.257 | -1.034 |
| ×Lang. | | | | | | | (0.414) | (0.651) |
| Ln NMR | | | | | | | $-0.393^a$ | $-1.086^a$ |
| ×No-Lang. | | | | | | | (0.131) | (0.380) |
| Obs. | 125,791 | 125,791 | 125,791 | 125,791 | 125,791 | 125,791 | 125,791 | 125,791 |
| Nb Firms | 4,594 | 4,594 | 4,594 | 4,594 | 4,594 | 4,594 | 4,594 | 4,594 |
| Pseudo R2 | 0.33 | 0.23 | 0.33 | 0.23 | 0.33 | 0.23 | 0.33 | 0.23 |

Significance levels: $^c$ $p < 0.1$, $^b$ $p < 0.05$, $^a$ $p < 0.01$. Columns (1), (3), (5) and (7) report export probability estimates, using a conditional logit with year×firm fixed effect, and bootstrapped standard errors clustered at the country×year level (using 200 replications). Columns (2), (4), (6) and (8) report individual export estimates, using a generalized Tobit with year and firm fixed effect, standard errors are clustered at the country×year level. All variables, but the dummies, are in logs. NMR measures the level of regulation in Professional Services in the destination country.

Table 8: Alternative Controls for the Business Environment: Impact on Export Probability and Export Values

| | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ | $P_r > 0$ | $\ln(x_{od})$ |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Ln Demand | 0.913$^a$ | 2.285$^a$ | 0.863$^a$ | 2.109$^a$ | 0.921$^a$ | 2.294$^a$ | 0.919$^a$ | 2.316$^a$ |
| | (0.054) | (0.127) | (0.065) | (0.132) | (0.055) | (0.124) | (0.054) | (0.125) |
| Ln Distance | -0.914$^a$ | -2.192$^a$ | -0.910$^a$ | -2.171$^a$ | -0.910$^a$ | -2.133$^a$ | -0.917$^a$ | -2.228$^a$ |
| | (0.078) | (0.208) | (0.062) | (0.173) | (0.083) | (0.194) | (0.086) | (0.213) |
| Com. lang. | 0.797$^a$ | 1.741$^a$ | 0.834$^a$ | 1.852$^a$ | 0.788$^a$ | 1.668$^a$ | 0.802$^a$ | 1.780$^a$ |
| | (0.117) | (0.323) | (0.118) | (0.300) | (0.115) | (0.323) | (0.123) | (0.334) |
| Border | 1.165$^a$ | 3.181$^a$ | 1.176$^a$ | 3.251$^a$ | 1.174$^a$ | 3.261$^a$ | 1.167$^a$ | 3.180$^a$ |
| | (0.157) | (0.351) | (0.181) | (0.392) | (0.155) | (0.347) | (0.156) | (0.347) |
| Ln Market pot. | -0.009 | -0.009 | 0.008 | 0.021 | -0.013 | -0.020 | -0.012 | -0.034 |
| | (0.046) | (0.124) | (0.043) | (0.109) | (0.048) | (0.132) | (0.050) | (0.133) |
| Export of goods | 4.041$^a$ | 6.643$^a$ | 4.020$^a$ | 6.512$^a$ | 4.035$^a$ | 6.701$^a$ | 4.038$^a$ | 6.667$^a$ |
| | (0.340) | (0.527) | (0.321) | (0.510) | (0.338) | (0.539) | (0.339) | (0.535) |
| Ln NMR | 0.142 | 0.150 | 0.105 | 0.199 | 0.183 | 0.420 | 0.159 | 0.191 |
| ×Goods | (0.312) | (0.577) | (0.295) | (0.538) | (0.310) | (0.608) | (0.312) | (0.574) |
| Ln NMR | -0.341$^a$ | -1.143$^a$ | -0.319$^a$ | -1.053$^a$ | -0.309$^a$ | -0.805$^b$ | -0.327$^a$ | -1.071$^a$ |
| ×No-Goods | (0.105) | (0.320) | (0.079) | (0.267) | (0.118) | (0.314) | (0.106) | (0.314) |
| Ln ICRG | -0.819 | -4.018$^a$ | | | | | | |
| | (1.072) | (2.422) | | | | | | |
| Ln Pol. stability | | | -0.337$^b$ | -1.282$^a$ | | | | |
| | | | (0.149) | (0.337) | | | | |
| Ln Quality | | | | | -0.009 | 0.440 | | |
| of regulation | | | | | (0.255) | (0.708) | | |
| Ln Accountability | | | | | | | -0.192 | -1.051 |
| | | | | | | | (0.348) | (0.842) |
| Obs. | 125,791 | 125,791 | 120,644 | 120,644 | 125,791 | 125,791 | 125,791 | 125,791 |
| Nb Firms | 4,594 | 4,594 | 4,534 | 4,534 | 4,594 | 4,594 | 4,594 | 4,594 |
| Pseudo R2 | 0.33 | 0.22 | 0.34 | 0.34 | 0.33 | 0.23 | 0.33 | 0.23 |

Significance levels: $^c$ $p < 0.1$, $^b$ $p < 0.05$, $^a$ $p < 0.01$. Columns (1), (3), (5) and (7) report export probability estimates, using a conditional logit with year×firm fixed effect, and bootstrapped standard errors clustered at the country×year level (using 200 replications). Columns (2), (4), (6) and (8) report individual export estimates, using a generalized Tobit with year and firm fixed effect, standard errors are clustered at the country×year level. Political Stability, Quality of Regulation and Accountability come from the World Development Indicators. The ICRG index comes from the PRS Group. All variables, but the dummies, are in logs. NMR measures the level of regulation in Professional Services in the destination country.